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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/672,992

09/26/2003

Hardayal Singh Gill

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09/28/2006

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EXAMINER

RENNER, CRAIG A

ART UNIT

PAPER NUMBER

2627

DATE MAILED: 09/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/672,992

Applicant(s)

GILL, HARDAYAL SINGH

Examiner

Craig A. Renner

Art Unit

2627

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-50 is/are pending in the application.
- 4a) Of the above claim(s) 1-17, 24-33 and 40-49 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 18-23, 34-39 and 50 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>26 September 2003</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

1. Claims 1-17 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to one or more non-elected inventions/species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 17 April 2006.
2. Applicant's election without traverse of "Species IV, Fig. 8," upon which "claims 18-23, 26-39 and 42-50" are said to "read," in the reply filed on 02 August 2006 is acknowledged. Claims 26-33 and 42-49, however, do not read on elected species IV of Fig. 8 as elected species IV of Fig. 8 does not include "wherein the first and second free layer each further comprises a first free sublayer, an interlayer and a second free sublayer" as per claims 26-28 and 42-44, "wherein the first pinned layer and second pinned layer further comprises self-pinned pinned layers" as per claims 29 and 45, "wherein the first and second pinned layers further comprises antiparallel magnetizations for providing a net magnetostatic bias of zero for the first and for the second pinned layers" as per claims 30 and 46, "wherein the first pinned layer further comprises three ferromagnetic layers" as per claims 31 and 47, and "wherein the first pinned layer comprises a bottom pinned layer having a first top ferromagnetic layer, a first spacer and a first bottom ferromagnetic layer and the second pinned layer comprises a top pinned layer having a second top ferromagnetic layer, a second spacer

and a second bottom magnetic layer” as per claims 32-33 and 48-49. Accordingly, claims 24-33 and 40-49 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to one or more non-elected inventions/species, there being no allowable generic or linking claim.

### ***Drawings***

3. The drawings are objected to because of the following informalities:

a. The drawings fail to comply with 37 CFR 1.84(p)(5) because they include one or more reference signs not mentioned in the description. Note, for instance, “1000” (shown in Fig. 10, for instance).

b. In Fig. 1, “Translator” should be spelled --Translator--.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) and/or an amendment to the specification in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Specification***

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

5. The disclosure is objected to because of the following informalities:

a. In line 14 on page 15, "spin valve read head 52" should be changed to --spin valve read head 500-- in order to be consistent with the remainder of the disclosure.

b. In line 18 on page 15, "differential amplifier 144" should be changed to --differential amplifier 544-- in order to be consistent with the remainder of the disclosure.

c. In line 9 on page 22, "free layers 844" should be changed to --free layers 844, 846-- in order to be consistent with the remainder of the disclosure.

d. In line 1 on page 23, "air bear surface" should be corrected to read --air bearing surface--.

e. In lines 16 and 18 on page 24, each instance of "first GMR sensor" should be changed to --second GMR sensor-- in order to be consistent with the remainder of the disclosure.

f. In line 1 in each of claims 19 and 35, "wherein bias structure" should be corrected to read --wherein the bias structure--.

g. In lines 1-2 of claim 21 and line 2 of claim 37, each instance of "layers further comprises" should be corrected to read --layers further comprise--.

h. In line 1 of claim 22 and lines 1-2 of claim 38, each instance of "the four NiFe further comprises" should be corrected to read --the four NiFe further comprise--.

i. In line 1 of claim 23 and line 2 of claim 39, each instance of "interlayers further comprises" should be corrected to read --interlayers further comprise--.

Appropriate correction is required.

6. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 18-23 and 34-39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. In line 5 of independent claim 18 and line 10 of independent claim 34, each instance of "the ... second free layer[s]" is/are indefinite because it/they lack clear and/or positive antecedent basis.

b. Claims 19-23 and 35-39 inherit the indefiniteness associated with their respective base claims and stand rejected as well.

***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 18, 34 and 50 are rejected under 35 U.S.C. 102(b) as being anticipated by Beach et al. (US 6,449,134).

With respect to claim 18, Beach teaches a differential GMR sensor (400) comprising a first self-pinned GMR sensor (includes layers 402, 302, 208 and 222, for instance) having a first pinned layer (302), a first spacer layer (208) and a first free layer (222); a bias structure (220) over the first free layer (as shown in FIG. 14, for instance), wherein the bias structure is formed to provide antiparallel magnetizations (226 and 228) for the first (222) and second (224) free layers without using an antiferromagnetic layer (as shown in FIG. 14, for instance); and a second self-pinned GMR sensor (includes layers 404, 304, 210 and 224, for instance) having a second pinned layer (304), a second spacer layer (210) and a second free layer (224).

With respect to claim 34, Beach teaches a magnetic disk recording system (30) comprising a magnetic storage medium (34) having a plurality of tracks for recording of

data; and a magnetic transducer (40) maintained in a closely spaced position relative to the magnetic storage medium during relative motion between the magnetic transducer and the magnetic storage medium, the magnetic transducer including a magnetoresistive read sensor (400), the magnetoresistive read sensor further comprising a first self-pinned GMR sensor (includes layers 402, 302, 208 and 222, for instance) having a first pinned layer (302), a first spacer layer (208) and a first free layer (222); a bias structure (220) over the first free layer (as shown in FIG. 14, for instance), wherein the bias structure is formed to provide antiparallel magnetizations (226 and 228) for the first (222) and second (224) free layers without using an antiferromagnetic layer (as shown in FIG. 14, for instance); and a second self-pinned GMR sensor (includes layers 404, 304, 210 and 224, for instance) having a second pinned layer (304), a second spacer layer (210) and a second free layer (224).

With respect to claim 50, Beach teaches a differential GMR sensor (400) comprising first means (includes layers 402, 302, 208 and 222, for instance, in at least an equivalent structural sense) having a first pinned layer (302), a first spacer layer (208) and a first free layer (222); a second self-pinned GMR sensor (includes layers 404, 304, 210 and 224, for instance) having a second pinned layer (304), a second spacer layer (210) and a second free layer (224); and means (includes 220, for instance, in at least an equivalent structural sense) for biasing the first and second pinned layers to provide antiparallel magnetizations for the first and second free layers without using an antiferromagnetic layer (as shown in FIG. 14, for instance).



***Pertinent Prior Art***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. This includes Mauri (US 5,768,069) and Gill (US 6,275,363), which each individually teaches an in-stack bias structure between first and second spin valves to antiparallel bias first and second free layer magnetizations of the first and second spin valves; and Nishioka et al. (US 5,648,885) and Gill (US 2002/0126426), which each individually teaches biased free multi-layer structures.

***Allowable Subject Matter***

12. Claims 19-23 and 35-39 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

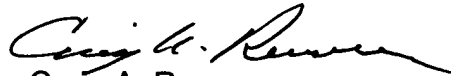
***Conclusion***

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig A. Renner whose telephone number is (571) 272-7580. The examiner can normally be reached on Monday-Tuesday & Thursday-Friday 9:00 AM - 7:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (571) 272-7579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2627

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Craig A. Renner  
Primary Examiner  
Art Unit 2627

CAR